

Mina Lake

Site Description

Location

Water designation number (WDN)	26-0003-00
Legal description	T123N-R66W-Sec.12-14, 23-26
County (ies)	Brown; Edmunds
Location from nearest town	14.0 miles east of Ipswich, South Dakota

Survey Dates and Sampling Information

Survey dates	July 30-August 1, 2013 (FN, GN) September 16, 2013 (EF-WAE)
Frame net sets (n)	18
Gill net sets (n)	6
Electrofishing-WAE (min)	40

Morphometry (Figure 1)

Watershed area (acres)	195,000
Surface area (acres)	806
Maximum depth (ft)	27
Mean depth (ft)	9

Ownership and Public Access

Mina Lake is an impoundment owned by the State of South Dakota and the fishery is managed by the SDGFP. Two public access sites are located on Mina Lake, one within the state park and the other along the southeastern shore near the outlet structure (Figure 1). The shoreline has mixed ownership including the State of South Dakota and private individuals.

Watershed and Land Use

Land use within the Mina Lake watershed is primarily agricultural with approximately 47% being cropland (cultivated and non-cultivated) and 40% being range/pastureland (Smith 2002). Housing and small shelterbelts/farmsteads comprise the remaining portions.

Water Level Observations

Water levels on Mina Lake are not monitored by SDDENR.

Fish Management Information

Primary species	Black Crappie, Bluegill, Channel Catfish, Walleye,
Other species	Black Bullhead, Common Carp, Emerald Shiner, Freshwater Drum, Golden Shiner, Green Sunfish, Largemouth Bass, Northern Pike, Orangespotted Sunfish, Rock Bass, Rudd, Shortnose Gar, White Bass, White Sucker, Yellow Perch
Lake-specific regulations	none
Management classification	warm-water permanent
Fish consumption advisories	none

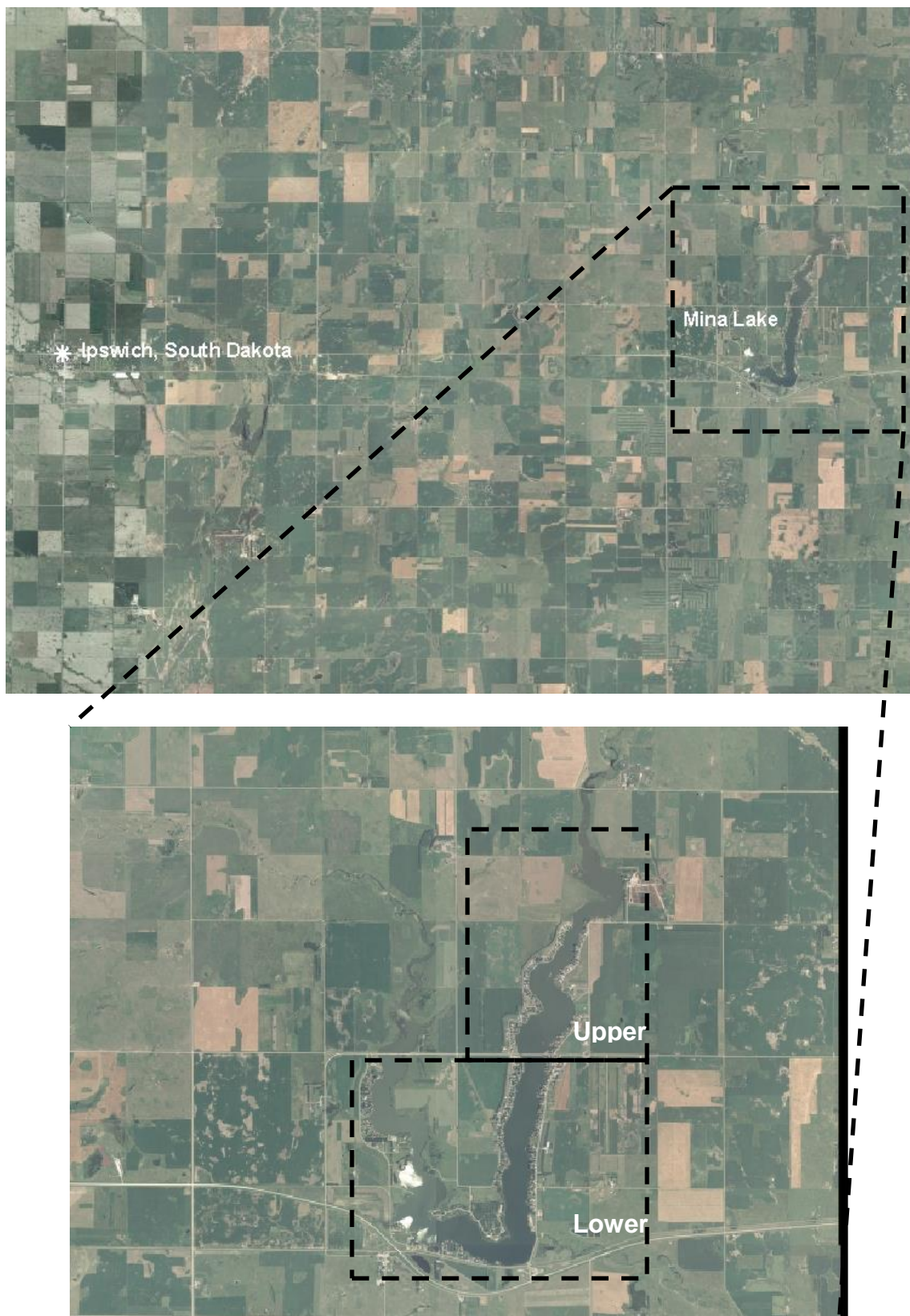


Figure 2. Map depicting geographic location of Mina Lake from Ipswich, Edmunds County, South Dakota (top). Also noted are upper and lower section designations (bottom).

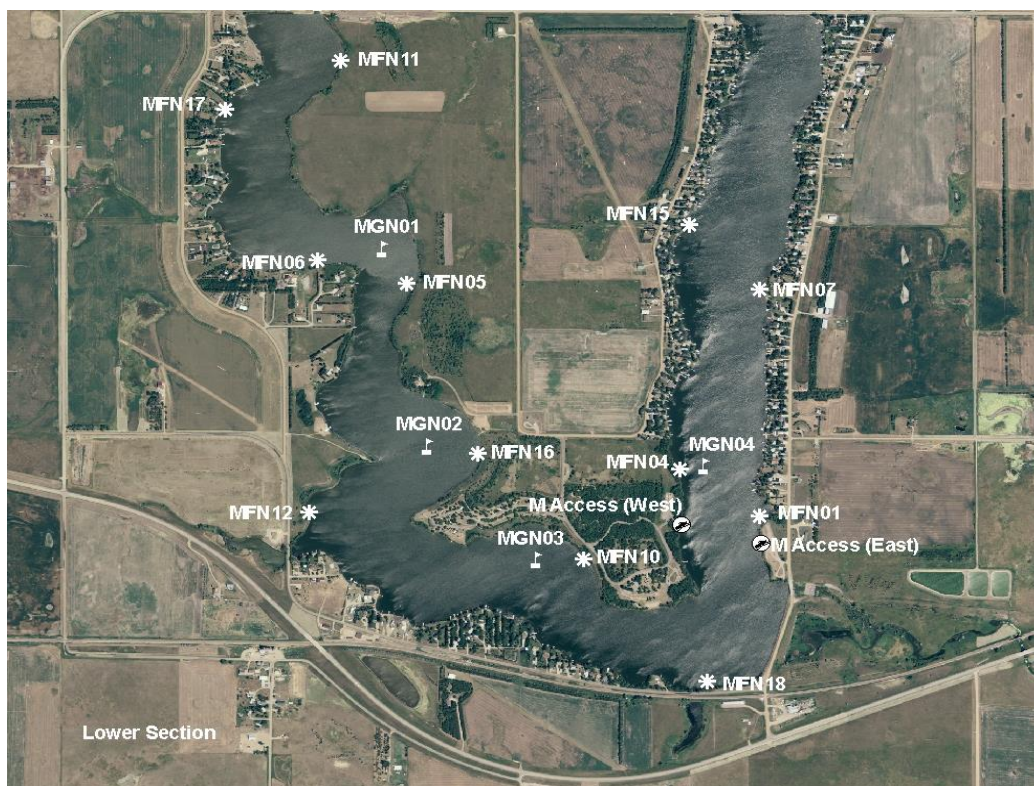


Figure 3. Map depicting access points and standardized net locations for upper and lower sections of Mina Lake, Edmunds County, South Dakota. MFN= frame nets, MGN= gill nets

Management Objectives

- 1) Maintain a mean frame net CPUE of stock-length Black Crappie ≥ 10 , a PSD of 30-60, and a PSD-P of 5-10.
- 2) Maintain a mean frame net CPUE of stock-length Bluegill ≥ 25 , a PSD of 30-60, and a PSD-P of 5-10.
- 3) Maintain a Channel Catfish population to diversify sport fishing opportunity in Mina Lake.
- 4) Maintain a mean gill net CPUE of stock-length Walleye ≥ 10 , a PSD of 30-60, and a PSD-P of 5-10.
- 5) Maintain a mean frame net CPUE of stock-length Black Bullhead ≤ 100 .

Results and Discussion

Mina Lake is an impoundment constructed in the 1930's on Snake Creek approximately 12 miles west of Aberdeen, South Dakota. Snake Creek drains portions of McPherson, Edmunds, and Brown counties in South Dakota (Smith 2002). Mina Lake is primarily managed as a Black Crappie, Bluegill, Channel Catfish and Walleye fishery.

Primary Species

Black Crappie: Three stock-length Black Crappie were captured in 2013 resulting in a mean frame net CPUE of 0.2 (Table 1) and below the minimum objective (≥ 10 stock-length Black Crappie/net night; Table 3). The 2013 frame net CPUE represented a substantial decrease from the 31.3 observed in 2012 (Table 2) and indicated low relative abundance. The cause of the substantial decrease in relative abundance is unknown. Low sample size precludes analysis of condition, size and age structure of the Black Crappie population.

Bluegill: The mean frame net CPUE of stock-length Bluegill was 6.7 (Table 1) and below the minimum objective (≥ 25 stock-length Bluegill/net night; Table 3). Since 2004, the mean frame net CPUE of Bluegill has fluctuated from a low of 0.6 (2009) to a high of 10.8 (2007; Table 2). Based on the 2013 frame net CPUE, relative abundance is considered moderate.

Frame net captured Bluegill ranged in TL from 7 to 24 cm (2.8 to 9.4 in; Figure 5). The PSD of 31 was within the management objective range (30-60) and the PSD-P of 13 was above the management objective range (5-10; Table 3).

No age or growth information was collected from Bluegill in 2013. Sampled Bluegill had mean W_r values exceeded >100 for all length categories (e.g., stock to

quality) sampled, with the mean W_r of stock-length Bluegill being 112 (Table 1) and an increasing trend in mean W_r was observed as TL increased.

Channel Catfish: From 2004-2006 relative abundance of Channel Catfish was low with mean frame net CPUE values commonly < 1.0 stock-length Channel Catfish/net night (Table 2). In 2007, the mean frame net CPUE of stock-length Channel Catfish increased to 4.8 (Table 1) and the mean frame net CPUE of sub-stock Channel Catfish was 16.3. The increase in Channel Catfish relative abundance can likely be attributed to the 2006 stocking of 42,350 fingerlings (Table 8).

From 2007-2011, the relative abundance of Channel Catfish remained relatively stable with mean frame net CPUE values ranging from 2.4 to 5.7 Channel Catfish/net night (Table 2). A decrease in mean frame net CPUE was observed in 2012 and 2013 to 1.2 and 0.6, respectively (Table 2). In 2012, 17,075 fingerling Channel Catfish were stocked and recruitment is unknown.

In 2013, 11 frame net captured Channel Catfish ranged in TL from 40 to 57 cm (15.7 to 22.4 in; Figure 6). It appears that a high proportion of Channel Catfish, likely from the 2006 stocking, surpassed quality-length which resulted in the high PSD of 91 (Table 1; Figure 6). No preferred-length Channel Catfish were sampled (Figure 6).

No growth information was available. All frame net captured Channel Catfish were in the quality-preferred length category which had mean W_r value of 109.

Walleye: Since 1998, recruitment of both naturally-produced and stocked Walleye has been extremely poor in Mina Lake. Walleye of various sizes have been stocked annually since 2004 with limited success (Table 4; Table 6). As a result mean gill net CPUE values for stock-length Walleye have remained low (Table 2). In 2010, 43 Walleye from the 2009 cohort, most of which were sub-stock, were captured in the gill net catch (Table 6; Figure 7). Recruitment of Walleye from the 2009 year class, which coincided with a small fingerling stocking (Table 6; Table 8) represented the first substantial Walleye recruitment in Mina Lake since 1998.

In 2013, gill nets captured 21 stock-length Walleye that ranged in TL from 27 to 51 cm (10.6 to 20.1 in), which resulted in a mean gill net CPUE of 3.5 (Table 1; Figure 7). The relative abundance of Walleye in Mina Lake in 2013 was the highest observed since 2004 but is still considered low (Table 2).

No age-0 Walleye were sampled during fall night electrofishing in 2013 likely indicating poor recruitment of stocked small fingerlings. Age-0 Walleye were sampled during the fall from 2009-2011 indicating improved but still limited recruitment compared to 2004-2008 (Table 2).

Four year-classes were represented in the 2013 gill net catch (2007, 2009-2011; Table 4). Growth is good with the weighted mean TL at capture for age-3 and age-4 Walleye of 390 and 411 mm (15.4 and 16.2 in), respectively (Table 5). Condition of Walleye was good with mean W_r values ranging from 83 to 94 for all length categories sampled.

Other Species

Black Bullhead: The mean frame net CPUE of stock-length Black Bullhead was 35.2 (Table 1). Since 2004, mean frame net CPUE values have ranged from 0.9 (2009) to 85.5 (2012) but remained within the objective range (≤ 100 stock-length Black Bullhead/net night; Table 3). The 2013 mean frame net CPUE decreased from the high of 85.5 in 2012 and relative abundance is considered high (Table 2).

Frame net captured Black Bullhead ranged in TL from 11 to 34 cm (4.3 to 13.4 in; Figure 8). The majority of frame net captured Black Bullheads were >quality-length which resulted in the high PSD of 96 (Table 1). The 2013 frame net PSD-P was 25 (Table 1).

No age or growth information was collected. Mean W_r values ranged from 85 to 91 for all length categories (e.g., stock to quality) sampled. No length-related trend in W_r was observed.

Freshwater Drum: The mean gill net CPUE of stock-length Freshwater Drum was 7.3 (Table 1) and represented an increase from the 3.3 observed in 2012 (Table 2). Since 2003, the mean gill net CPUE of Freshwater Drum has ranged from a low of 3.3 (2012) to a high of 30.2 (2007; Table 2).

Freshwater Drum captured in the 2013 gill net catch ranged in TL from 32 to 40 cm (12.6 to 15.7 in), had a PSD of 100 and PSD-P of 7 (Figure 9). No age or growth information was available in 2013. Most Freshwater Drum sampled in the gill nets were in the quality-preferred length category, which had a W_r value of 94 (Table 1). A decreasing trend in mean W_r was observed as TL increased.

Yellow Perch: Mina Lake has a low to moderate density Yellow Perch population that is likely inhibited by habitat characteristics similar to other large impoundments in Region IV (i.e., Richmond Lake and Elm Lake). In 2013, the mean gill net CPUE of stock-length Yellow Perch was 8.7 (Table 1). Since 2004, the mean gill net CPUE of stock-length Yellow Perch has fluctuated from 1.7 (2008) to 14.8 (2012; Table 2). Although low to moderate relative abundance limits the Yellow Perch fishery in Mina Lake, Yellow Perch present can reach sizes attractive to anglers. Gill net captured Yellow Perch in 2013 ranged in TL from 15 to 27 cm (5.9 to 10.6 in).

Northern Pike: The 2013 mean gill net CPUE for Northern Pike was 0.7 (Table 1). Since 2004, mean gill net CPUE values have ranged from 0.0 (2006, 2007) to 3.5 (2008; Table 2). Gill net captured Northern Pike ranged in TL from 49 to 57 cm (19.3 to 22.4 in).

Other: Common Carp and White Sucker were captured in low numbers during the 2013 survey (Table 1).

Management Recommendations

- 1) Conduct fish community assessment surveys on an annual basis (next survey scheduled in summer 2014) to monitor fish relative abundance, fish population size structure, fish growth and stocking success.
- 2) Collect otoliths from Black Crappie, Bluegill, and Walleye to assess the age structure and growth rates of each population.
- 3) Stock Channel Catfish fingerlings (≈ 50 fingerlings/acre) every third year (when available) to bolster the Channel Catfish fishery in Mina Lake.
- 4) Conduct fall night electrofishing on an annual basis to monitor age-0 Walleye relative abundance.
- 5) Stock Walleye at (≈ 100 small fingerlings/acre) to establish additional year classes if fall night electrofishing CPUE of young-of-the-year Walleye and gill netting results warrant [i.e., low gill net CPUE of sub-stock (i.e., < 25 cm; 10 in) Walleye and/or fall night electrofishing CPUE of age-0 Walleye < 75 fish/hour].
- 6) Continue research to explore poor Walleye survival.

Table 1. Mean catch rate (CPUE; gill/frame nets= catch/net night, electrofishing= catch/hour) of stock-length fish, proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish, and mean relative weight (Wr) of stock-length fish for various fish species captured in gill nets, frame nets, and electrofishing in Mina Lake, 2013. Confidence intervals include 80 percent (\pm CI-80) or 90 percent (\pm CI-90). BLB= Black Bullhead; BLC= Black Crappie; BLG= Bluegill; CCF= Channel Catfish; COC= Common Carp; FRD= Freshwater Drum; NOP= Northern Pike; WAE= Walleye; WHS= White Sucker; YEP= Yellow Perch

Species	Abundance		Stock Density Indices			Condition		
	CPUE	CI-80	PSD	CI-90	PSD-P	CI-90	Wr	CI-90
<i>Frame nets</i>								
BLB	35.2	12.3	96	1	25	3	90	1
BLC	0.2	0.1	100	0	100	0	---	---
BLG	6.7	2.1	31	7	13	5	112	2
CCF	0.6	0.2	91	17	0	---	109	13
COC	0.2	0.2	100	0	33	67	90	12
FRD	0.4	0.3	100	0	25	31	91	11
NOP	0.9	0.3	50	23	6	11	73	8
WAE	0.1	0.1	0	---	0	---	76	---
WHS	0.5	0.2	100	0	100	0	98	3
YEP	1.2	0.5	82	15	5	7	97	5
<i>Gill nets</i>								
BLB	17.0	4.6	95	4	16	6	92	1
BLG	0.3	0.5	25	59	25	59	135	19
CCF	3.2	0.4	100	0	16	15	101	10
COC	0.2	0.3	100	---	0	---	89	---
FRD	7.3	1.6	100	0	7	7	93	1
NOP	0.7	0.5	75	59	0	---	77	17
WAE	3.5	1.3	62	19	5	8	91	3
YEP	8.7	2.0	81	9	12	8	106	<1
<i>Electrofishing</i>								
WAE ¹	0.0	---	---	---	---	---	---	---

¹ Fall night electrofishing-WAE; catch rate (CPUE) represents age-0 Walleye/hour

Table 2. Historic mean catch rate (CPUE; gill/frame nets= catch/net night, electrofishing= catch/hour) of stock-length fish for various fish species captured in frame nets, experimental gill nets, and by electrofishing from Mina Lake, 2004-2013. BLB= black bullhead; BLC= Black Crappie; BLG= Bluegill; CCF= Channel Catfish; COC= Common Carp; FRD= Freshwater Drum; GSF= Green Sunfish; HYB= Hybrid Sunfish; LMB= Largemouth Bass; NOP= Northern Pike; OSF= Orangespotted Sunfish; ROB= Rock Bass; SHG= Shortnose Gar; WAE= Walleye; WHB= White Bass; WHS= White Sucker; YEP= Yellow Perch

Species	CPUE									
	2004	2005	2006 ³	2007 ³	2008	2009	2010	2011	2012	2013
<i>Frame nets</i>										
BLB	15.8	11.6	6.0	16.2	5.8	0.9	8.9	8.1	85.5	35.2
BLC	1.3	0.9	25.9	9.0	2.5	3.2	1.1	16.7	31.3	0.2
BLG	6.8	6.4	5.9	10.8	1.8	0.6	1.8	3.9	5.6	6.7
CCF	0.2	0.4	0.6	4.8	2.4	3.6	4.2	5.7	1.2	0.6
COC	1.0	2.4	1.7	6.0	1.9	2.1	1.0	1.1	0.5	0.2
FRD	0.7	1.2	2.3	3.7	2.3	2.1	1.1	1.0	0.0	0.4
GSF	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0
HYB ¹	0.0	0.0	2.0	0.3	0.0	0.2	0.0	0.0	0.0	0.0
NOP	0.8	0.6	0.3	0.2	3.2	2.2	2.4	1.1	2.0	0.9
OSF ¹	0.0	0.0	0.4	11.9	0.0	0.0	0.1	0.0	0.0	0.0
ROB	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
SHG ¹	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
WAE	0.1	0.3	0.5	0.2	0.3	0.3	0.3	0.5	0.7	0.1
WHB	0.1	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0
WHS	0.2	0.1	0.7	1.2	0.3	0.3	0.3	0.1	0.1	0.5
YEP	3.1	1.4	2.3	1.1	1.7	1.9	1.0	1.4	2.1	1.2
<i>Gill nets</i>										
BLB	5.5	1.0	6.0	10.3	8.2	12.2	10.7	7.5	44.7	17.0
BLC	0.0	0.0	0.7	0.0	0.0	0.0	0.5	1.5	1.0	0.0
BLG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
CCF	0.0	0.0	0.7	1.0	1.7	1.8	0.8	1.7	1.0	3.2
COC	2.3	0.8	5.2	15.5	8.7	1.2	0.2	0.2	1.2	0.2
FRD	4.0	8.2	17.0	30.2	19.0	12.8	6.0	7.2	3.3	7.3
LMB	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
NOP	0.5	0.5	0.0	0.0	3.5	1.5	3.3	0.3	1.3	0.7
OSF ¹	0.2	0.0	0.0	0.0	0.5	0.5	0.0	0.0	0.0	0.0
WAE	1.3	0.3	0.5	0.3	1.0	0.2	0.7	1.8	1.2	3.5
WHS	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0
YEP	5.3	9.3	9.2	4.2	1.7	4.3	6.0	8.3	14.8	8.7
<i>Electrofishing</i>										
WAE ²	0.0	0.0	0.0	0.0	0.0	54.9	10.8	31.0	---	0.0

¹ All fish sizes

² Fall electrofishing-WAE; catch rate (CPUE) represents age-0 Walleye/hour

³ Monofilament gill net mesh size (0.75", 1.00", 1.25", 1.50", 2.00" and 2.50")

Table 3. Mean catch rate (CPUE; gill/frame nets= catch/net night), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish, and mean relative weight (Wr) of stock-length fish for selected species captured by frame nets and gill nets in Mina Lake, 2004-2013. BLB= Black Bullhead; BLC= Black Crappie; BLG= Bluegill; WAE= Walleye

Species	2004	2005	2006 [†]	2007 [†]	2008	2009	2010	2011	2012	2013	Objective
<i>Frame nets</i>											
BLB											
CPUE	16	12	6	16	6	1	9	8	86	35	≤ 100
PSD	99	100	90	23	45	56	74	69	93	96	---
PSD-P	12	25	47	6	1	0	0	1	6	25	---
Wr	87	89	87	87	89	88	87	83	94	90	---
BLC											
CPUE	1	1	26	9	3	3	1	17	31	<1	≥ 10
PSD	100	59	6	100	58	100	20	58	90	100	30-60
PSD-P	74	59	5	21	44	26	15	4	15	100	5-10
Wr	103	117	122	113	118	117	118	113	112	---	---
BLG											
CPUE	7	6	6	11	2	1	2	4	6	7	≥ 25
PSD	38	71	72	41	94	40	66	94	55	31	30-60
PSD-P	20	10	7	9	3	30	19	13	21	13	5-10
Wr	114	119	124	122	124	124	122	116	123	112	---
<i>Gill nets</i>											
WAE											
CPUE	1	<1	1	<1	1	<1	1	2	1	4	≥ 10
PSD	100	100	67	100	83	100	0	0	29	62	30-60
PSD-P	13	50	67	50	33	0	0	0	0	5	5-10
Wr	96	105	105	100	107	115	82	89	84	91	---

[†] Monofilament gill net mesh size (0.75", 1.00", 1.25", 1.50", 2.00" and 2.50")

Table 4. Year class distribution based on the expanded age/length summary for Walleye sampled in gill nets and associated stocking history (# stocked x 1,000) from Mina Lake, 2009-2013.

Survey Year	Year Class							
	2013	2012	2011	2010	2009	2008	2007	2006
2013			5	4	11		1	
2012	---				7			
2011	---	---			11			
2010	---	---	---		43			
2009	---	---	---	---	1			
fry								800
sm. fingerling	49	81	80	80	80	80	81	
lg. fingerling		7						23
								33

[†] Monofilament gill net mesh size (0.75", 1.00", 1.25", 1.50", 2.00" and 2.50").

Table 5. Weighted mean TL at capture (mm) for Walleye sampled in experimental gill nets (expanded sample size) from Mina Lake, 2005-2013. Note: sampling was conducted at approximately the same time during each year allowing comparisons among years to monitor growth trends.

Year	Age								
	0	1	2	3	4	5	6	7	8
2013	---	---	317 (5)	390 (4)	411 (11)	---	513 (1)	---	---
2012	---	---	---	357 (7)	---	---	---	---	---
2011	---	---	303 (11)	---	---	---	---	---	---
2010	---	224 (43)	---	---	---	---	---	---	---
2009	122 (1)	---	---	---	489 (1)	---	---	---	---
2008	---	---	364 (1)	---	---	---	501 (2)	493 (2)	551 (1)
2007	---	---	---	429 (1)	---	---	514 (1)	---	---
2006	---	330 (1)	---	---	---	520 (1)	520 (1)	---	---
2005	---	---	---	---	---	---	510 (2)	---	---

Table 6. Stocking history including size and number for fishes stocked into Mina Lake, 2005-2013. CCF= Channel Catfish; WAE= Walleye

Year	Species	Size	Number
2005	WAE	large fingerling	33,310
2006	WAE	fry	800,000
	WAE	large fingerling	23,110
	CCF	fingerling	42,350
2007	WAE	small fingerling	80,780
2008	WAE	small fingerling	80,000
2009	WAE	small fingerling	80,115
2010	WAE	small fingerling	80,300
2011	WAE	small fingerling	79,980
2012	CCF	fingerling	17,075
	WAE	small fingerling	80,850
	WAE	large fingerling	7,485
2013	WAE	small fingerling	48,900

Table 7. Year class distribution based on the expanded age/length summary for Yellow Perch sampled in gill nets from Mina Lake, 2012-2013.

Survey Year	Year Class						
	2013	2012	2011	2010	2009	2008	2007
2013		5	30	7	10		
2012	---		8	17	55	2	7

Table 8. Weighted mean TL (mm) at capture by gender for Yellow Perch captured in experimental gill nets (expanded sample size) from Mina Lake, 2012.

Year	Age				
	1	2	3	4	5
2013					
Male	---	205 (8)	212 (5)	224 (4)	---
Female	159 (5)	216 (22)	237 (2)	263 (6)	---
Combined	159 (5)	213 (30)	219 (7)	248 (10)	---
2012					
Male	150 (5)	188 (5)	218 (10)	254 (1)	229 (2)
Female	155 (3)	211 (12)	230 (43)	274 (1)	265 (3)
Combined	152 (8)	203 (17)	227 (55)	264 (2)	244 (7)

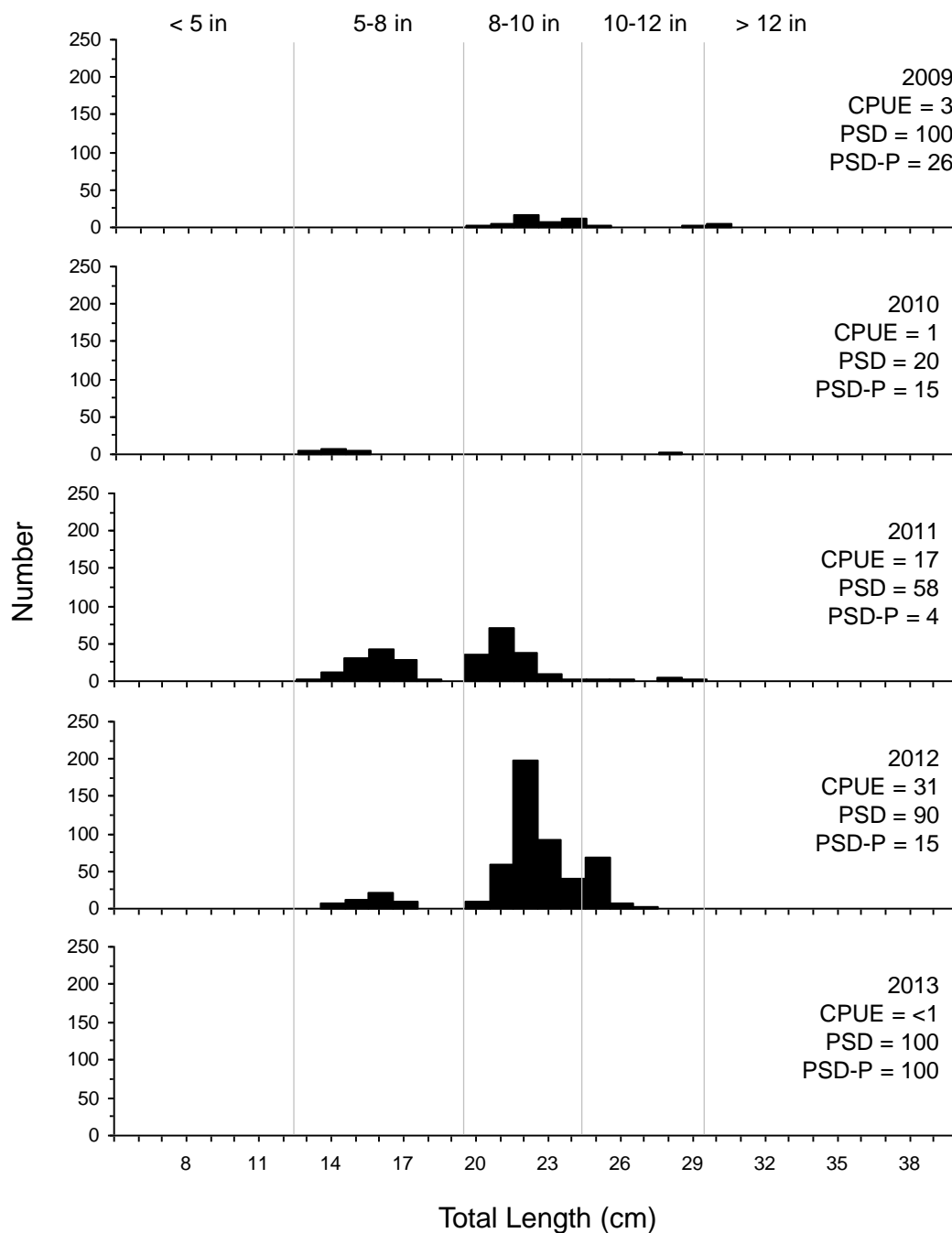


Figure 4. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for Black Crappie captured using frame nets in Mina Lake, 2009-2013.

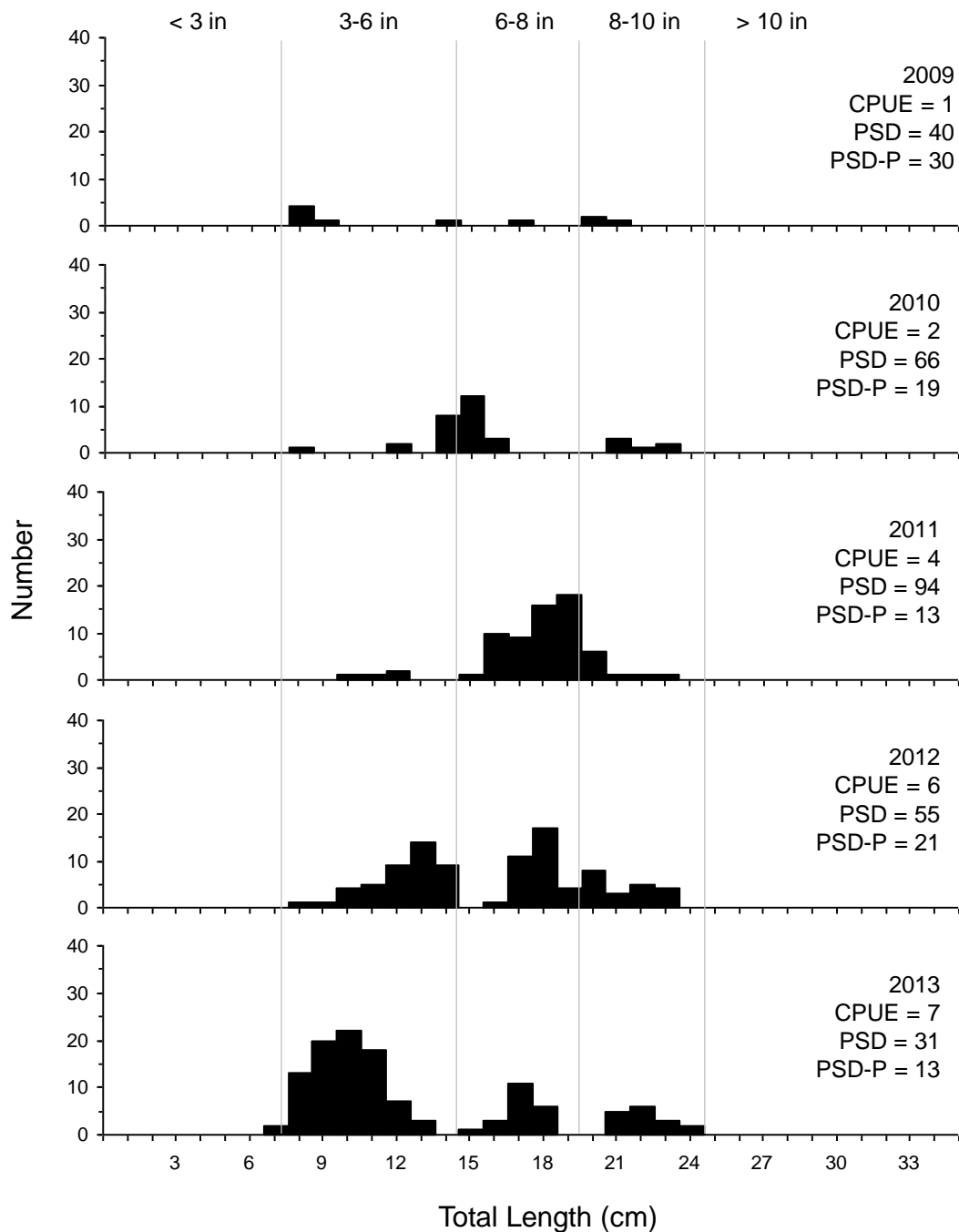


Figure 5. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for Bluegill captured using frame nets in Mina Lake, 2009-2013.

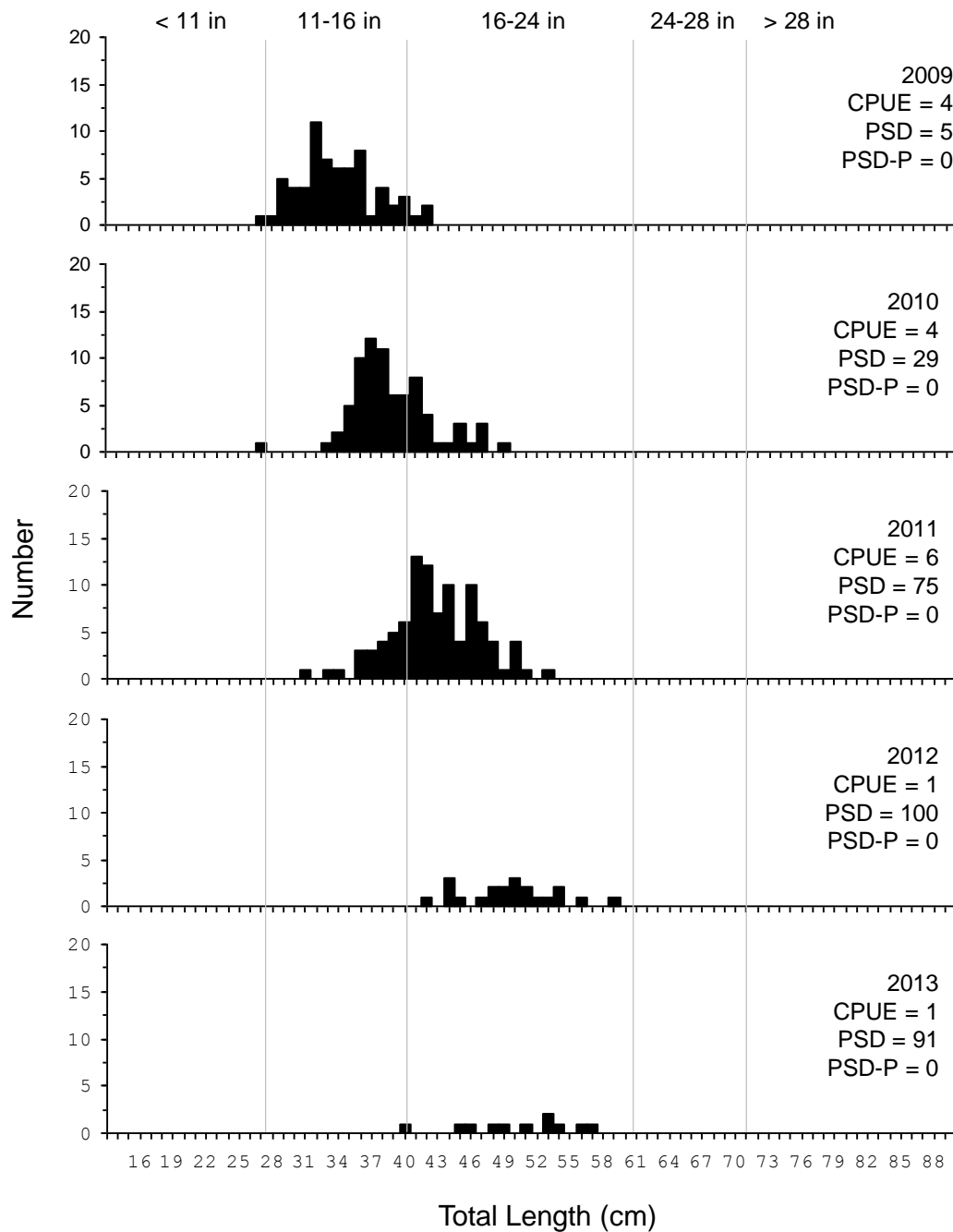


Figure 6. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for Channel Catfish captured using frame nets in Mina Lake, 2009-2013.

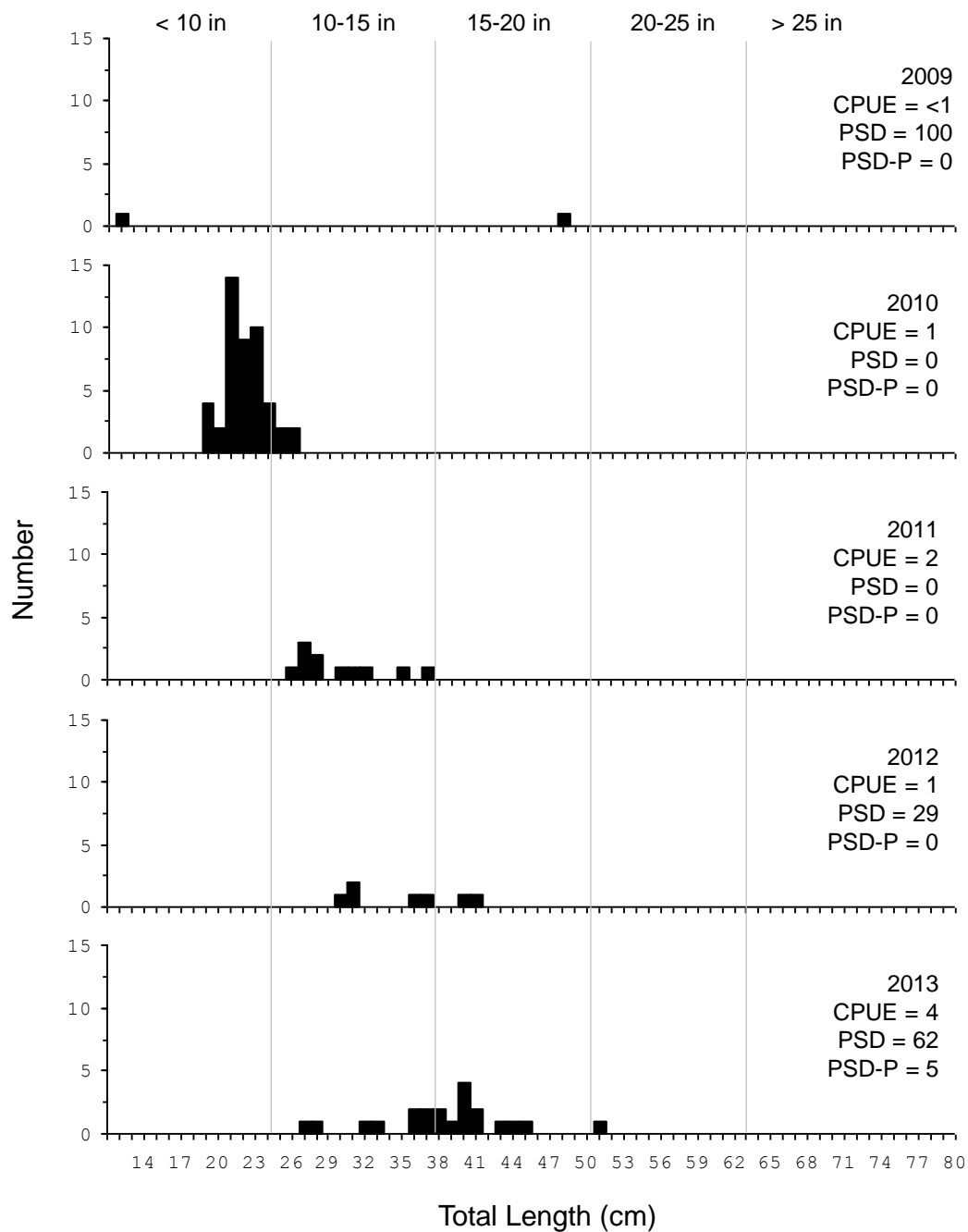


Figure 7. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for Walleye captured using gill nets in Mina Lake, 2009-2013.

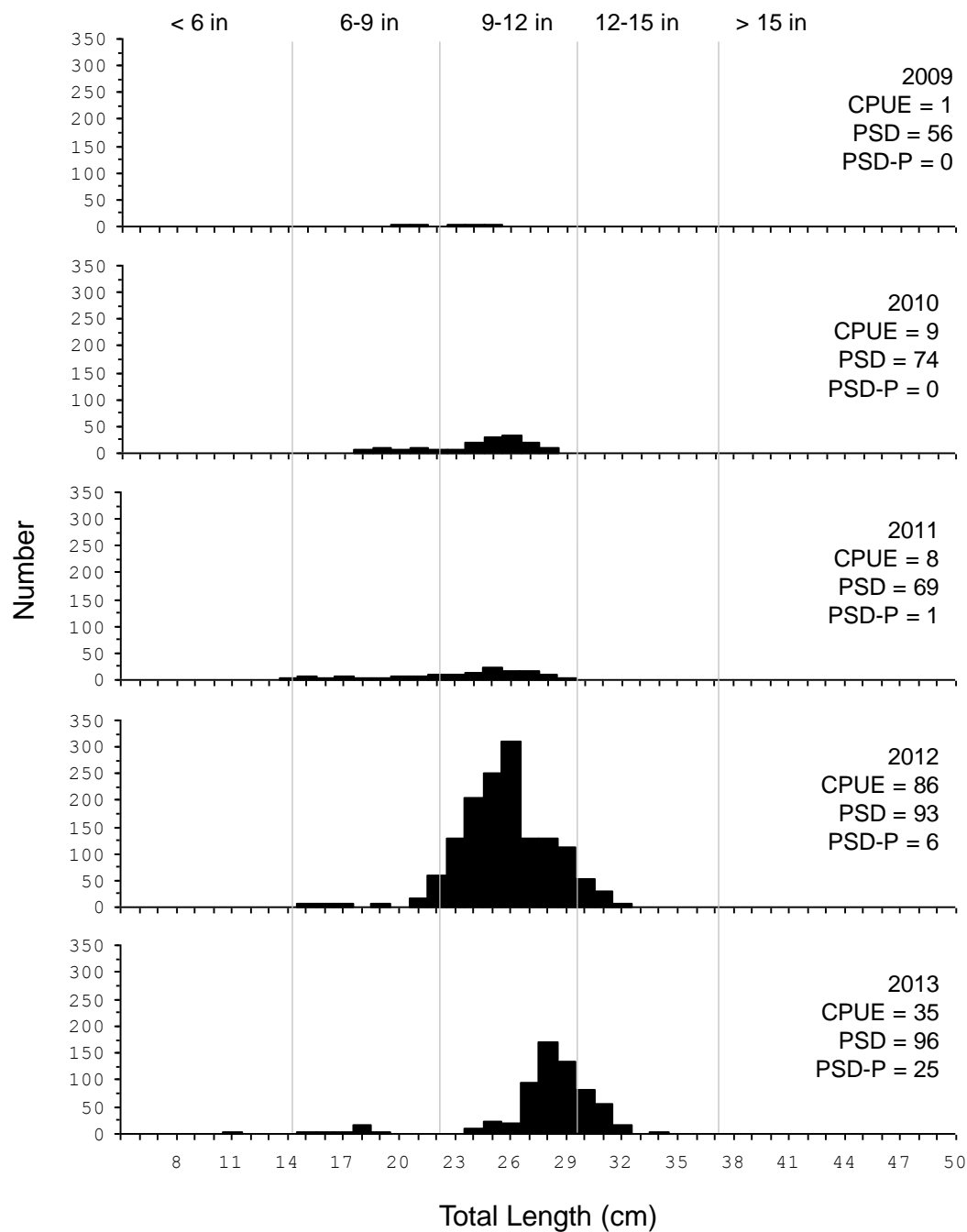


Figure 8. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for Black Bullhead captured using frame nets in Mina Lake, 2009-2013.

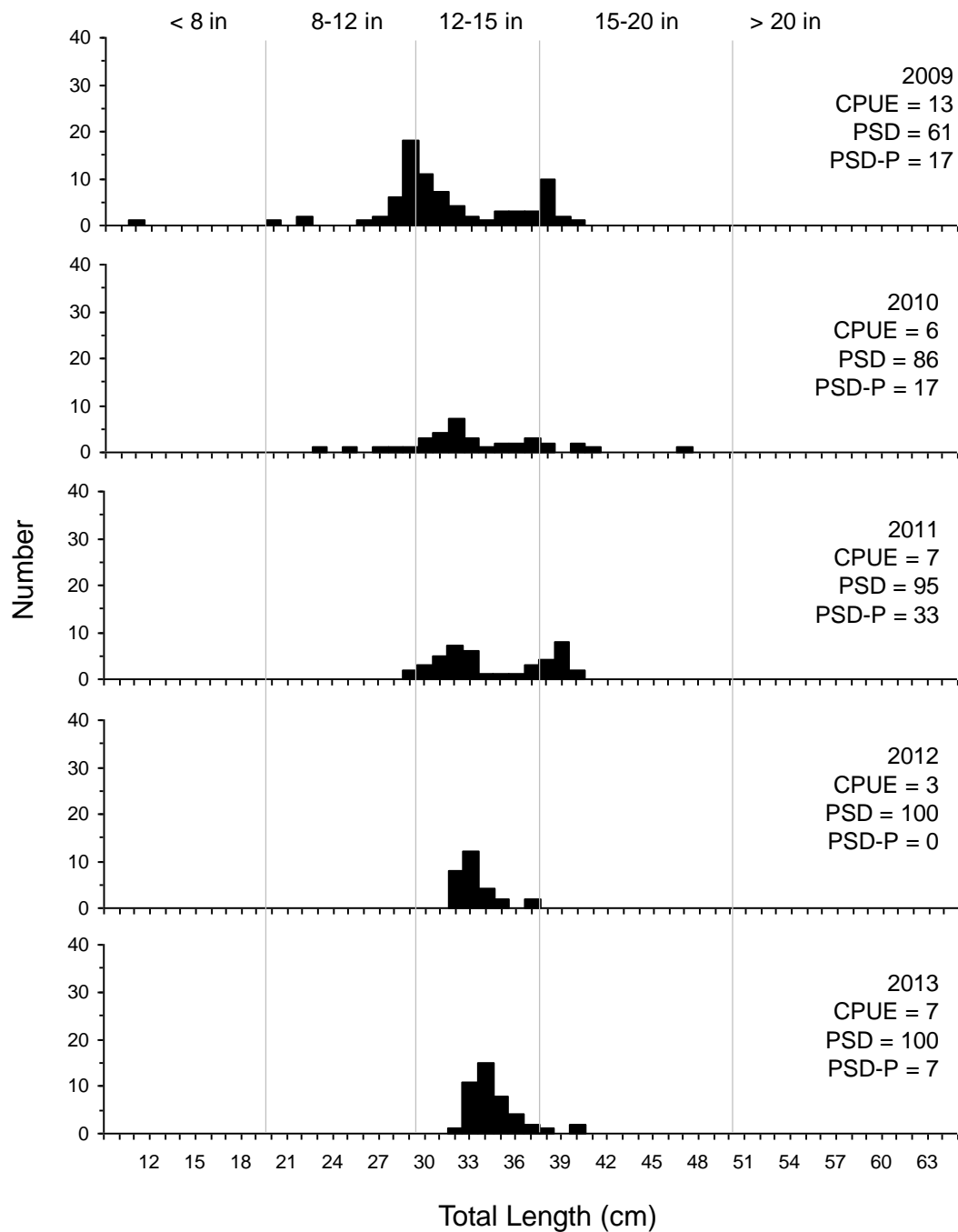


Figure 9. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for Freshwater Drum captured using gill nets in Mina Lake, 2009-2013.

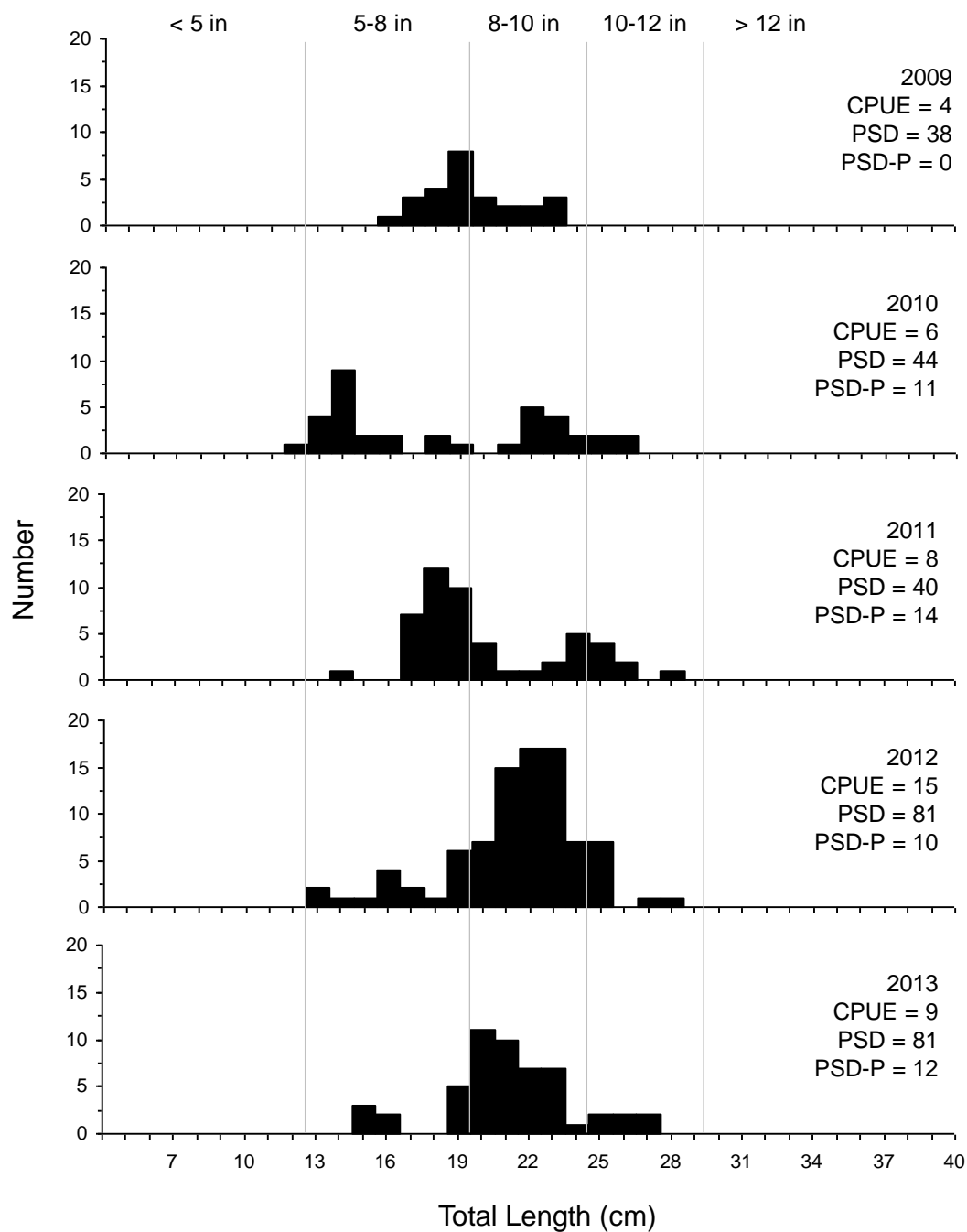


Figure 10. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for Yellow Perch captured using experimental gill nets in Mina Lake, 2009-2013.